HONORABLE TANA LIN

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

BUNGIE, INC., a Delaware corporation,
 	
    Plaintiff,
 	
v.
 	
KUNAL BANSAL, an individual, d/b/a
LAVICHEATS.COM,
 	
    Defendant.
	Case No. 2:21-cv-1111-TL
	
	DECLARATION OF ED KAISER, PH.D. IN SUPPORT OF PLAINTIFF'S MOTION FOR DEFAULT JUDGMENT AGAINST DEFENDANT KUNAL BANSAL
	
	NOTE ON MOTION CALENDAR:
	February 17, 2023

I, Ed Kaiser, declare and state as follows:

1.　　I am over 18 years of age. This Declaration is based upon personal knowledge and, if called as a witness, I could and would testify competently to the information provided herein.

2.　　I hold a Ph.D. in Computer Science/Network Security from Portland State University.

3.　　I have been employed by Plaintiff Bungie, Inc. since 2010. From October 2010 through September 2011, I was an Associate Engineer with Bungie, working on preproduction of Bungie's video game *Destiny*. I then held the position of Engineer for four years at Bungie, during which time my responsibilities included designing and implementing core game systems for both *Destiny* and *Destiny 2*. In October 2015, I was promoted to Senior Engineer and my responsibilities included working on research and development for future versions of *Destiny* and

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1 *Destiny 2*, collaborating with designers and other engineers to develop feature specifications, and

2 working with other engineers to overhaul and modernize the *Destiny* and *Destiny 2* game engines

3 (*i.e.*, the software that supports gameplay, networking, and display, among other functions).

4   4.   I am currently an Engineering Lead for Bungie. As an engineering lead, I lead the

5 Product Security Team within the Central Technology group. I manage a team of senior

6 engineers and security analysts. I am responsible for the technical aspects of software security

7 for all Bungie products, including *Destiny 2*. This responsibility includes, among other things,

8 reviewing technical plans, evaluating technical risks, and ensuring that Bungie products are as

9 secure as possible. In this role, I have become familiar with technical issues related to *Destiny 2*

10 cheats, hacks, and other malicious software and activities impacting the operation of *Destiny 2*.

11   5.   *Destiny 2* is a video game that Bungie originally released in September 2017. The

12 game is now a "free-to-play" game with paid expansions, continually-refreshed downloadable

13 content ("DLC"), and an estimated player base of more than 30 million players. I am intimately

14 familiar with both the *Destiny* and *Destiny 2* game engines, including the software code on which

15 they are based, having developed and improved core systems since *Destiny* preproduction in

16 October 2011.

17   6.   I also have significant experience identifying, investigating, and implementing

18 fixes to stop cheaters and other bad actors in *Destiny 2*. Cheat software is computer code that

19 copies, modifies, and/or interacts with a game engine, including the engine for *Destiny 2*, in

20 order to enable the cheat user to perform certain actions or see certain information within

21 *Destiny 2* that non-cheating players cannot do or see. For example, cheat software may enable a

22 cheat user to see non-cheating players through solid walls, to automatically aim their weapon

23 without any input by the cheat user, or to modify the cheat user's character or weapon attributes

24 in beneficial ways.

25   7.   My experience identifying, investigating, and implementing fixes to stop cheaters

26 includes my Ph.D. thesis, which incorporated novel techniques to identify cheaters and

27 proportionally limit their access based on the scale of their negative impact within the game,

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1 advising on various security features within the *Destiny 2* game engine including special

2 networking to prevent DDoS (Distributed-Denial-of-Service) attacks on players as well as

3 matchmaking and game designs to mitigate some of the impact of cheaters on non-cheating

4 players, and investigations into *Destiny 2* cheat software and those who develop it.

5   8.   To address the concerns about cheating activity in *Destiny 2*, Bungie engineers

6 are actively involved in mitigating and attempting to reduce or eliminate cheating in the game.

7 Bungie's analysts actively work to identify software used by players to cheat in *Destiny 2*.

8 Bungie's engineering team also develops, maintains, and improves anti-cheat technical measures

9 to detect and thwart cheat software, polices the *Destiny 2* servers for cheaters, reviews cheat

10 reports from other players, and bans accounts that use cheating or hacking software in the game.

11 Bungie employees spend hundreds of hours each year engaged in these anti-cheat activities.

12 However, despite these efforts and the significant resources expended on those efforts, cheat

13 developers continue to modify and refine their cheat software to circumvent detection.

14   9.   Many of the cheat software for first-person shooter games like *Destiny 2*,

15 including Defendant's cheat software for *Destiny 2*, include a feature called "ESP" or extra-

16 sensory perception, which allows users of the cheat software to see the location of other

17 *Destiny 2* players and non-player characters ("NPCs"), including through solid walls and other

18 similar visual obstacles, by displaying a distinct box around the other players, displaying the

19 players' names, and their distance from the cheat user. In order for this feature of the cheat

20 software to function, the cheat software needs to (a) ascertain the location of other players and

21 NPCs and (b) display the relevant information to the cheat user within the game. Both of these

22 actions require copying and modifying Bungie's software code in *Destiny 2*.

23   10.   One part of Bungie's software code for *Destiny 2* consists of data structures that

24 correspond to certain attributes of the game, including for example, player positioning (i.e.,

25 where each player and NPC is located in the game at any given moment). The data structures

26 provide a precise layout for individual pieces of data stored and organized in a computer's

27 memory so that the video game functions as intended when running on the players' computers.

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1 For example, the player positioning data (including the player's position, movement, and facing)

2 tells the software where a player is located within the *Destiny 2* world. Another part of Bungie's

3 software code for *Destiny 2* consists of data structures and functions dedicated to *Destiny 2*'s

4 rendering, which determines what each player sees from their character's perspective and where

5 the player is aiming their character's weapon while playing the game.

6   11.   To enable the cheat software's ESP feature, the developer needed to copy the data

7 structures associated with player positioning in *Destiny 2* to ascertain the location of other

8 characters, and reverse engineer the software code for the game's rendering functions to modify

9 what is displayed. The developer then had to incorporate cheat software derived from copied

10 *Destiny 2* code into every copy of the cheat software that was sold or distributed.

11   12.   To use the cheat software, including Defendant's cheat software for *Destiny 2*, the

12 cheat user runs an authentic (*i.e.*, licensed) copy of *Destiny 2* on their computer while also

13 running a copy of the cheat software. In order for the cheat software features to work while

14 playing *Destiny 2*, the cheat software injects into (*i.e.*, runs its software code inside) the game

15 engine. The injected code extracts information to which the cheat user does not ordinarily have

16 access from the player positioning data structures and then manipulates the rendering data

17 structures and calls the camera and display functions (that are ordinarily only called by other

18 game functions within an authentic copy of *Destiny 2*) to create the modified *Destiny 2* that

19 displays boxes and player information around other characters.

20   13.   Such cheat software, including Defendant's cheat software for *Destiny 2*, also

21 includes a feature called "aimbot," which allows users of the cheat to aim their weapons

22 automatically and accurately at other players and NPCs with little to no user input (*i.e.*,

23 movement of the mouse).

24   14.   Similar to the ESP feature, the aimbot feature of the cheat software could only

25 function in *Destiny 2* if the developers copied the *Destiny 2* software code that corresponds to the

26 data structures for player positioning (which includes where the player is aiming their weapon),

27 and/or reverse engineered the *Destiny 2* software code that calculates the angle deltas for mouse

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1   movements (*i.e.*, software code used to calculate how far the weapon cursor moves in *Destiny 2*

2   in response to user inputs). The developers then incorporated cheat software derived from copied

3   *Destiny 2* code into every copy of the cheat software that was sold or distributed.

4   15.   Again similar to the ESP feature, in order for the cheat software to call the

5   necessary functions within *Destiny 2* to enable users of the cheat software to automatically aim at

6   other players or NPCs (*i.e.*, use the aimbot feature), the cheat software must inject code into the

7   authentic copy of *Destiny 2* on the users' computers. The injected code modifies the player input

8   data structures and calls functions in *Destiny 2* to automatically aim at other players.

9   16.   The cheat software, including Defendant's "Premium" cheat software for

10   *Destiny 2*, also include a feature known as "One Position Kill" or OPK. OPK, which is similar to

11   another feature referred to as "teleport to crosshair," allows cheat software users to cause other

12   players to either respawn at or move (teleport) to a single position so that they may be damaged

13   by area-of-effect abilities at once, accelerating the rate at which cheat users accumulate rewards

14   and accolades. In other words, the OPK feature automatically teleports players to a position

15   advantageous to the cheat user, an ability that is not permitted in the normal operation of

16   *Destiny 2*. The OPK feature does not change the victim's display so that they are often unaware

17   of exactly how they have been damaged and defeated.

18   17.   Like the ESP feature, the OPK feature of the cheat software could only function

19   in *Destiny 2* if the cheat developers copied the *Destiny 2* software code that corresponds to the

20   data structures for player and combatant positioning. The developers would then have had to

21   incorporate cheat software derived from copied *Destiny 2* code into every copy of the cheat

22   software that was sold or distributed. And again, in order for the cheat software to call the

23   necessary functions and manipulate the character positions to enable the cheat users to teleport

24   other players to one position, the cheat software must inject code into the authentic copy of

25   *Destiny 2* on the cheat users' computers. The injected code then modifies the player input data

26   structures and calls functions in *Destiny 2* to teleport the other players.

27   18.   Bungie periodically modifies or updates the *Destiny 2* software code when new

1   DLC is released or to fix known errors or bugs in the software code. These modifications or

2   updates frequently include changes to the software code associated with the player positioning

3   data structures, the rendering code, and other relevant data structures. If an update to the

4   *Destiny 2* software code included updates to any code that the cheat software copies and/or

5   modifies in order to provide its features, the cheat developers would need to update the cheat

6   software to correspondence with the updates to the *Destiny 2* software code. This would

7   necessarily entail creating new copies of the updated *Destiny 2* data structures and software code,

8   and incorporating those new copies into the updated cheat software. As a necessary result, users

9   of the updated cheat software also would create yet another copy of a modified *Destiny 2* with

10   the updated cheat software code running inside the *Destiny 2* game engine.

11   19.   One of the most popular cheat software for *Destiny 2* is a cheat sold by the entity

12   known as Ring-1 (the "Ring-1 Cheat"). Based on the investigation conducted by Unit 221B on

13   Bungie's behalf in connection with this lawsuit, Bungie learned that the Defendant in this case is

14   a reseller of the Ring-1 Cheat, which is rebranded as Defendant's "Premium" cheat for

15   *Destiny 2*.

16   20.   Bungie is currently pursuing claims against the developers of the Ring-1 Cheat in

17   a separate lawsuit pending in the United States District Court for the Northern District of

18   California, *Bungie, Inc., et al. v. Thorpe, et al.*, No. 3:21-CV-05677-EMC. In the course of that

19   lawsuit, Bungie's anti-cheat team has become familiar with the Ring-1 Cheat.

20   21.   As Engineering Lead, I supervised an investigation into the Ring-1 Cheat's

21   method of embedding into a client computer and avoiding detection. The Ring-1 Cheat for

22   *Destiny 2* is a hypervisor-based cheat, meaning that it requires administrative rights to the

23   player's computer even before the operating system starts up. This type of software leverages the

24   same vulnerabilities that malware and rootkits use to take over internet-connected devices or to

25   deploy ransomware. The developers of the Ring-1 Cheat did not need to find a remote exploit to

26   get the cheat software onto the player's system in the first place – the player willingly installs the

27   software. However, I doubt that any user of the Ring-1 Cheat fully understands the impact of

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1   installing the software or the malicious acts that Ring-1's controllers could perform with that

2   access. It would not be difficult for a Ring-1 controller to abuse their access to obtain personal

3   data or financial information from a user, or to upload ransomware, or to hijack a user's system

4   to distribute CSAM, as just a few examples of possible malicious actions.

5   I declare under penalty of perjury under the laws of the United States that the foregoing is

6   true and correct to the best of my knowledge.

7   Executed this 16th day of February, 2023, at Bellevue, Washington.

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9   ED KAISER

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